FIG.1

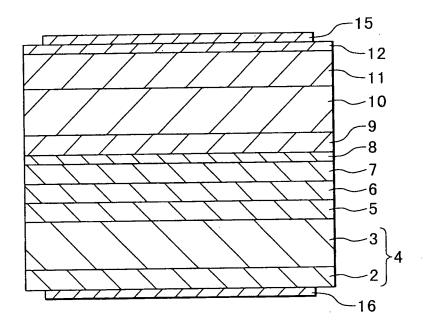


FIG.2A

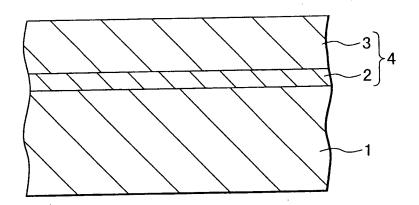


FIG.2B

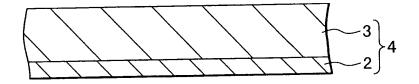


FIG.3

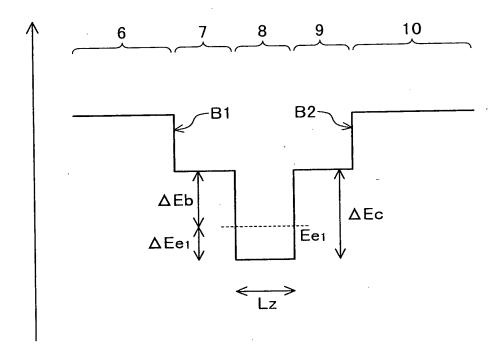


FIG.4

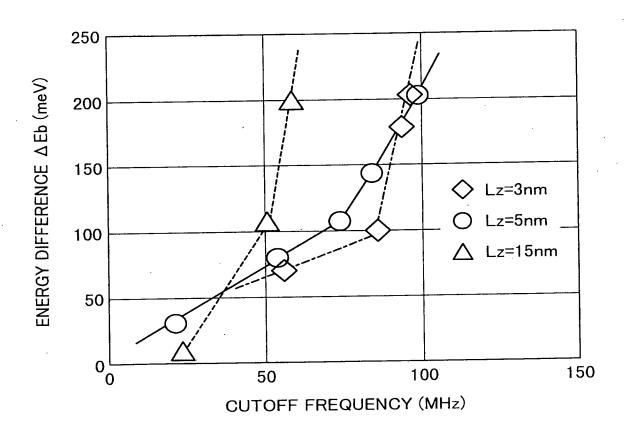


FIG.5

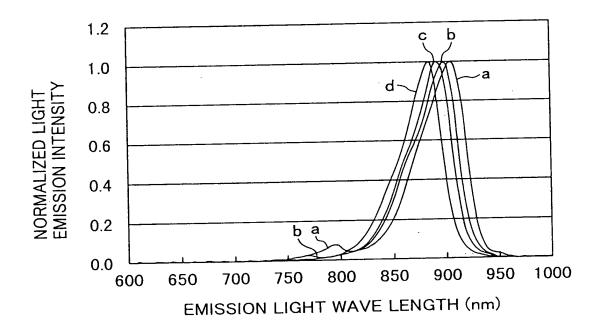
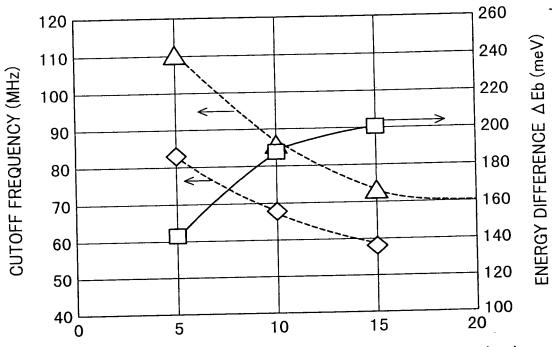
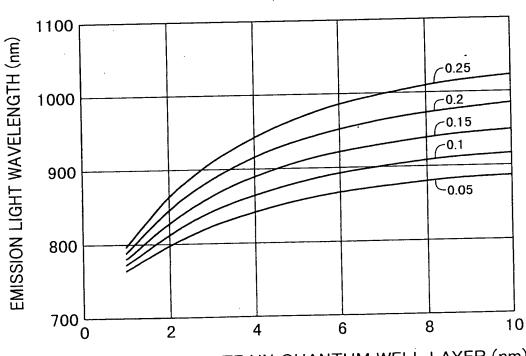


FIG.6



THICKNESS Lz OF STRAIN QUANTUM WELL LAYER (nm)

FIG.7



THICKNESS OF STRAIN QUANTUM WELL LAYER (nm)

FIG.8

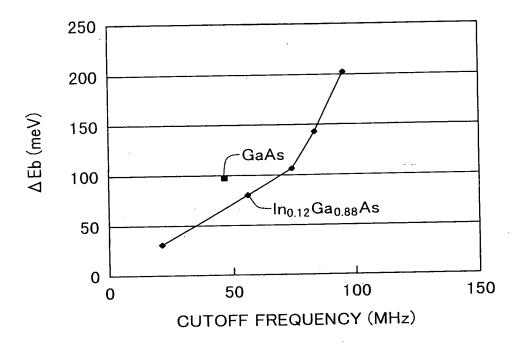


FIG.9

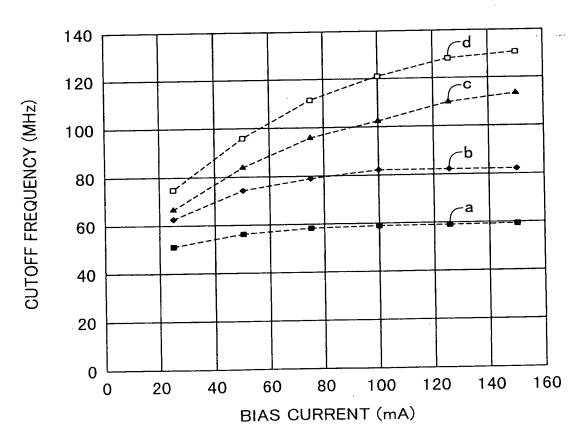
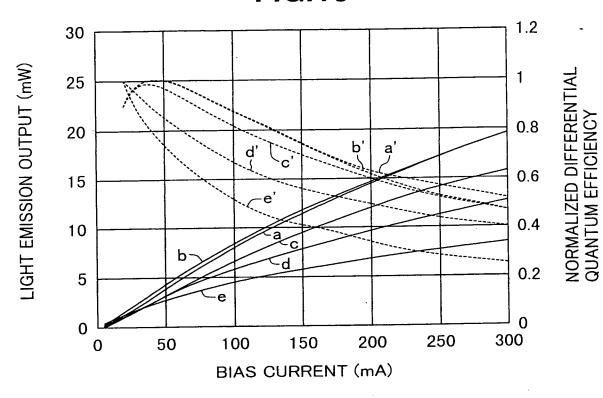


FIG.10





1

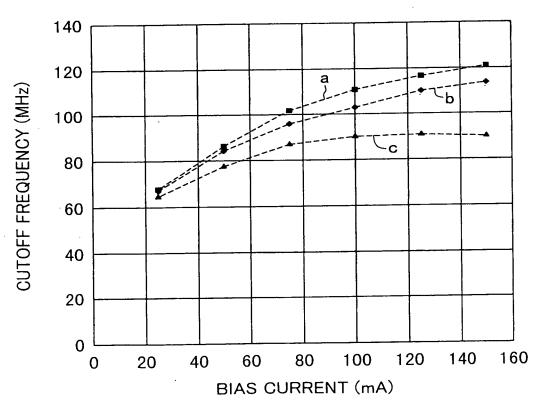


FIG.12

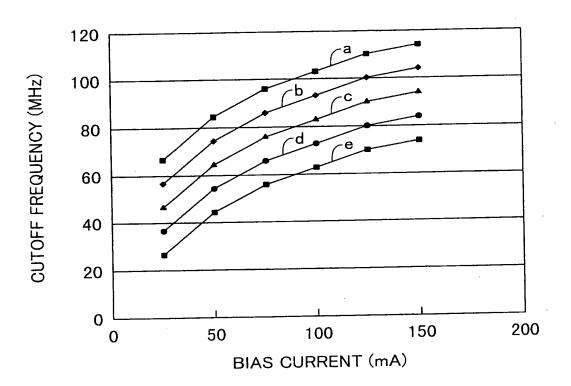


FIG.13

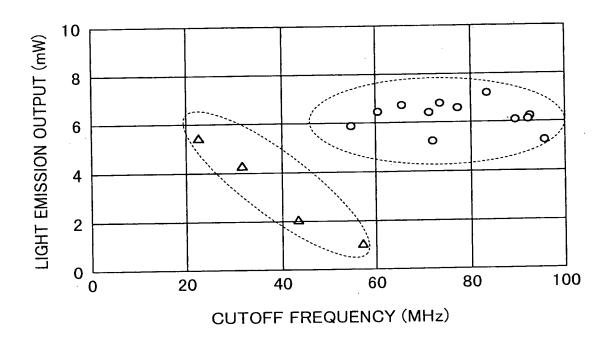
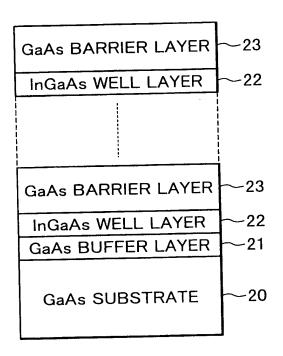


FIG.14



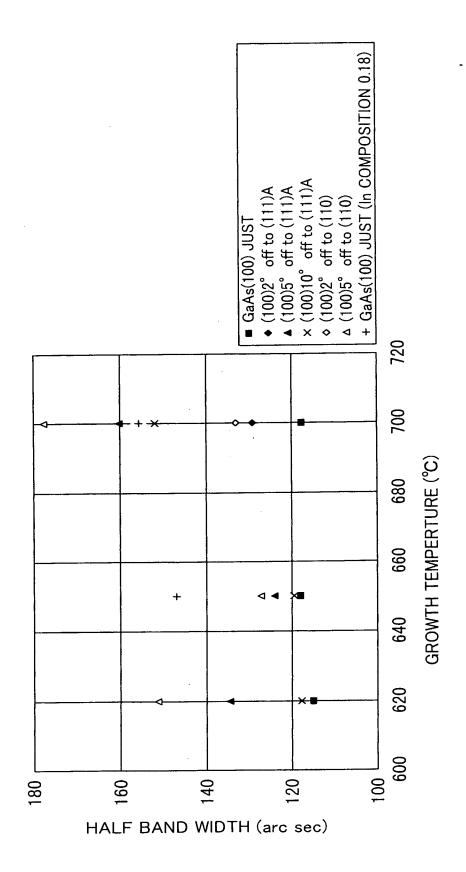


FIG.16A

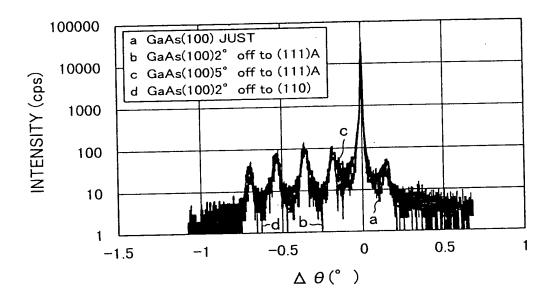
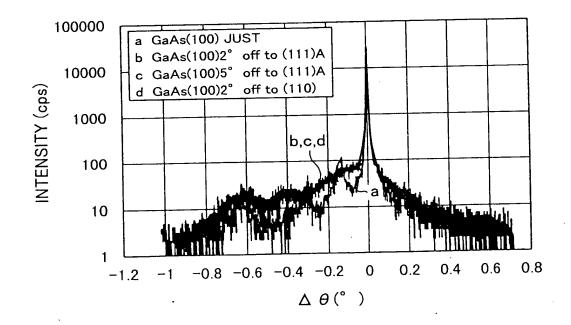


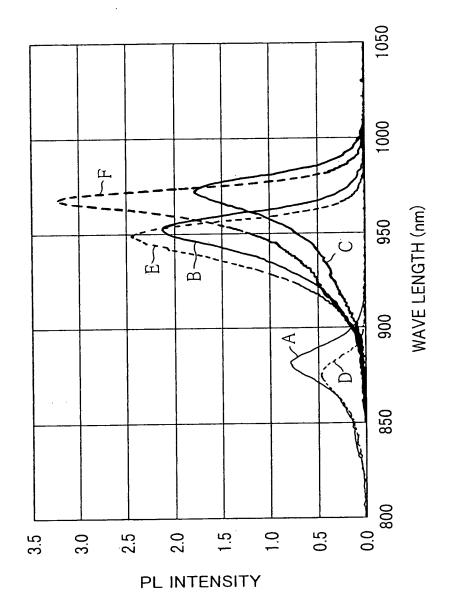
FIG.16B

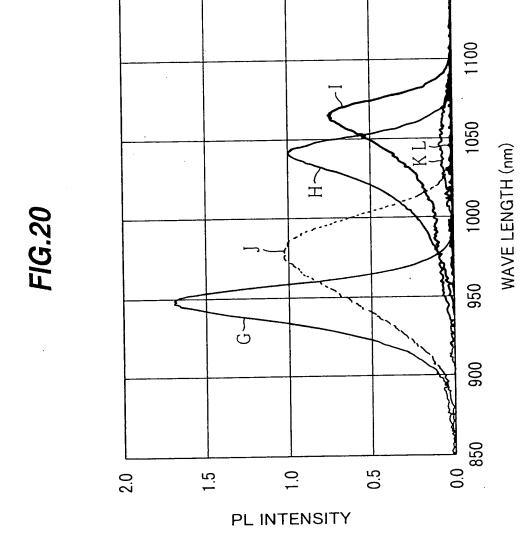


GaAs CAP LAYER	~-37
Al _{0.39} Ga _{0.61} As CLAD LAYER	~-36
Al _{0.26} Ga _{0.74} As CARRIER CONFINEMENT LAYER	~-35
InGaAs WELL LAYER	~-34
Al _{0.26} Ga _{0.74} As CARRIER CONFINEMENT LAYER	~-33
Al _{0.39} Ga _{0.61} As CLAD LAYER	~32
GaAs BUFFER LAYER	~31
GaAs SUBSTRATE	~30

	IngaAs QUANTUM WELL LAYER	WELL LAYER	SUBSTRATE
In COM	In COMPOSITION RATIO	THICKNESS (nm)	
	0.12	5	GaAs(100) JUST
	0.12	10	GaAs(100) JUST
	0.12	15	GaAs(100) JUST
	0.12	5	GaAs(100)5° off to (111)A
	0.12	10	GaAs(100)5° off to (111)A
	0.12	15	GaAs(100)5° off to (111)A
	0.18	5	GaAs(100) JUST
	0.18	10	GaAs(100) JUST
	0.18	15	GaAs(100) JUST
	0.18	2	GaAs(100)5° off to (111)A
	0.18	10	GaAs(100)5° off to (111)A
	0.18	15	GaAs(100)5° off to (111)A
1			

FIG. 19





49	
Ge/Au ELECTRODE	1
Si-GaAs CONTACT LAYER	~48
Si-Al _{0.18} Ga _{0.82} As CURRENT DIFFUSION LAYER	~~47
Si-Al _{0.39} Ga _{0.61} As CLAD LAYER	~~46
Al _{0.26} Ga _{0.74} As CARRIER CONFINEMENT LAYER	~ 45
InGaAs WELL LAYER	~44
Al _{0.26} Ga _{0.74} As CARRIER CONFINEMENT LAYER	
Zn-Al _{0.39} Ga _{0.61} As CLAD LAYER	~ 42
Zn-GaAs BUFFER LAYER	~ 41
Zn-GaAs SUBSTRATE	40
AuZn ELECTRODE	- -50

		ILLANTIN SASSAL	P.C. A. OLIANTIIM WELL I AYER)	HALF BAND	CUTOFF
		こうしゅう かつごう		_	WIDTH (nm) OF	FREQUENCY
SAMPLE	SUBSTRATE	In COMPOSITION RATIO	In COMPOSITION THICKNESS (nm)	(mW)	EL SPECTRUM	(MHz)
3	GaAs(100) JUST	0.12	ഹ	2.2	46.3	81.9
•					Į, į	0 0 0
×	GaAs(100)5° off to (111)A	0.12	လ	2.1	5/.6	0.87
						- 40+
>	GaAs(100) JUST	0.25	က	2.0	20.8	103.1
				,	0	1100
7	GaAs(100)5° off to (111)A	0.25	က	1.3	99.9	112.3
]						

WAVE LENGTH (nm)

FIG.24

